

a² each of the subject's hands can electrically come in contact with each of the first and second current path forming electrodes when the card type body fat determining device is held in the hands, to form a current path of substantially constant length and to enable the impedance between two points in the middle of the current path to be measured under substantially constant conditions, thereby reducing variations in impedance measurements.--

REMARKS

Reconsideration of this application in view of the present amendment, the attached Sketches, and the following remarks is respectfully requested.

Amended claims 1-6 and new claim 7 are presented with this amendment.

Applicant acknowledges with appreciation the resetting of the response time in accordance with Paper No. 9 dated February 16, 2000, and forwarding applicant the two cited references which were not provided with the initial Office Action of January 10, 2000.

Claim Objections

Applicant has amended the claims to meet the objections stated with respect to claims 1-6 and with respect to claim 2.

Claim Rejections - 35 U.S.C. §112

The claims have been amended as suggested by the Examiner to meet the stated rejections of claims 3-6 and 3-5. The Examiner's assistance is acknowledged with appreciation.

The Present Claims

The gist of the present invention is in providing a body fat determining device which utilizes electrodes provided such that the fingertips of each of the hands of a subject can contact the electrodes to form a current path of constant length. Also, the impedance is measured between substantially fixed points in the middle of the current path and because fingertips come in contact with the electrodes, the impedance measurement is substantially constant and variations in the measured impedance value are reduced.

These distinctions have been made more clearer in the presently submitted amended claims 1-6. The same distinctions discussed above are also submitted in the new claim 7.

These claim recited features of the fingertips enabled electrodes, the formed current path of constant length, and the reduction in impedance measurement variations are set forth in the specification, for instance, see pages 7, 8, 14, 7 and 20.

Claim Rejections - 35 U.S.C. §102

The rejection of claims 1 and 2 under Section 102(b) as anticipated by Masuo '782 and the rejection of claims 1 and 2 under Section 102(e) as anticipated by Masuo '031 are traversed for the following reasons.

The body fat determining device of the present invention as recited in independent claims 1 and 7 includes two current paths forming electrodes and two measuring electrodes and measures an impedance of the body using four fingers of a subject. A current path is formed within the subject's body between the two current paths forming electrodes which are contacted by respective fingertips of two fingers of each of the hands of the subject. The impedance of the body is measured between two measuring electrodes which are contacted by respective fingertips of another two fingers of each of the hands of the subject. The fingertip contacted electrodes enable the formed current path through each arm and the body to be of a constant length. Measurement of the impedance is on two points in the middle of the current path and the fingertip electrodes enable the impedance measurement to be substantially constant, thereby reducing variations in the measurement of the impedance value.

In contrast, Masuo '782 discloses an impedance measurement device having hand grips 12 and 13 (Fig. 1) on which four electrodes are formed. As seen from the upper-left portions of Figs. 4 and 7-12 of Masuo '782, the electrodes 17,

18, 19, 20 are in contact with the palms of the subjects hands--as opposed to the electrodes of the present invention which are sized and provided to be in contact with the fingertips of the subject as recited in independent claims 1 and 7.

These structural differences provide more accurate impedance measurements in the present invention as compared to the cited references. Attached to the present amendment is a sheet containing Sketch 1 and Sketch 2. Sketch 1 illustrates the current paths formed in the subject's hand when using the device of the present invention. Sketch 2 illustrates the current path formed in the subject's hand when using the device disclosed in Masuo '782. From Sketch 2, it can be seen that if the contact positions of the palm with the electrodes in the Masuo '782 device are changed, the length of the current path formed in the subject's body varies for each measurement. This results in inaccurate impedance measurements.

In contrast, in the device of the present invention, as shown in Sketch 1, the impedance is measured between substantially fixed points P1 to P1, (in the middle of the current path) in respective hands which are defined as the crossing point of the current path line (solid line) and the voltage detection line (dashed line). As can be seen from Sketch 1, the length of the current path from P1 to P1 is a constant current path, and not only is the impedance measured

in the middle, i.e., on, the current path, also the length of the impedance measurement path defined from P1 to P1 is substantially constant. Moreover, because it is known that an amplifier in the impedance measuring means has a very large impedance, the impedance between the point P1 and the contact point Q of the fingertip is negligible. Accordingly, applicants' fingertip provided electrodes enable reproducible impedance measurements of significant improvement compared to the cited reference.

Masuo '031 also lacks fingertip provided electrodes and therefore also lacks the patentable distinctions recited above with respect to Masuo '782. Notice for instance that the similar hand grip elements 12, 13 in Masuo '031 with annular electrodes 17, 18, 19, 20 have the same changing contact points as in Masuo '782. Thus, in Masuo '031, various portions of the subject's palm and fingers can contact the electrodes during usage and the contact positions are subject to change from measurement to measurement, so that the same inaccurate impedance measurements result as indicated previously with respect to Masuo '782.

Accordingly, presently submitted independent claims 1 and 7 reciting the electrodes sized and provided to be contacted by the user's fingertips forming a constant length current path and an impedance measurement on the current path thereby reducing variations in the measured impedance value, patentably distinguish over Masuo '782 and Masuo '031, taken

singularly or in any combination.

Claim Rejections - 35 U.S.C. §103

The rejection of claims 3-6 under Section 103(a) as obvious based on the Examiner's suggested combination of Yamazaki and Masuo '031 is respectfully traversed for the following reasons.

As noted by the Examiner, Yamazaki does not include two electrode pairs for finger contact. Instead, the Examiner suggests that Masuo '031 shows electrodes "positioned on the hand grips such that one of the fingers on each hand, such as the thumb would be in contact with the current forming electrode, while the other fingers would be in contact with the measuring electrode." (Office Action page 4).

However, as noted above, Masuo '031 does not disclose, teach or suggest the use of electrodes sized and positioned such that the fingertips of the fingers and/or thumb are placed in contact with the electrodes to form a constant length current path and impedance measurements with variations reduced. In Masuo '031, the same change in contact positions of the user's hand is obtained, thereby resulting in the same inaccurate impedance measurements as described in connection with Sketch 2.

Accordingly, any combination of Yamazaki and Masuo '031 or Yamazaki and Masuo '782 does not disclose, teach or suggest the patentable distinctions recited in the present

claims where electrodes are sized and positioned to be contacted by the fingertips, to enable a constant length current path and a reduction in variations in impedance measurements to be obtained.

The Cited, Unapplied References

Applicant has reviewed the five cited and unapplied references identified on pages 5 and 6 of the Office Action. As noted by the Examiner, none of the cited, unapplied art discloses the use of electrodes in contact with fingers of both hands of the subject. Accordingly, any combination of the cited, unapplied references with Masuo '782, or Masuo '031, or Yamazaki, does not disclose, teach or suggest the present claims 1-7 for the reasons recited previously.

Housekeeping

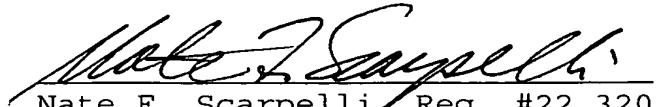
Formal drawings meeting the Draftsperson's objections will be submitted upon the allowance of the present application.

The acknowledgment of the claim for priority under 35 U.S.C. §119 and receipt of the priority document by the Patent Office is noted. The Examiner's consideration of applicants' submitted Information Disclosure Statement and the references identified on PTO-1449 is noted.

Conclusion

This application with claims 1-7 is in condition for allowance and such action is respectfully requested.

Respectfully submitted,



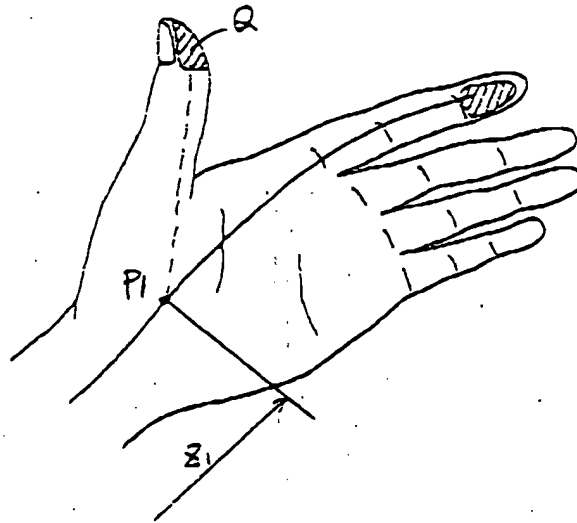
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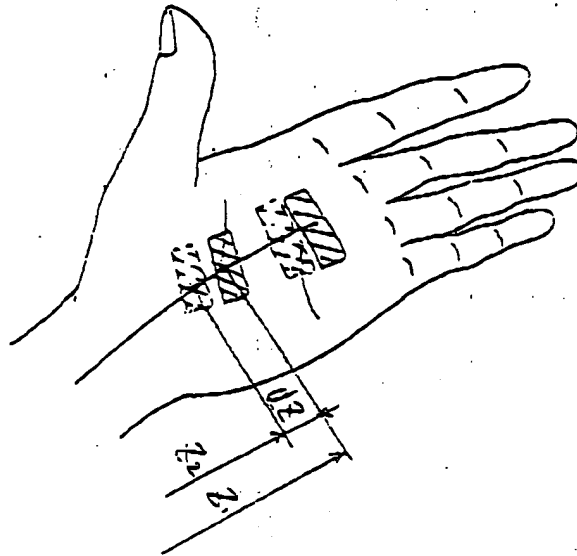
Dated:

May 16, 2000

Sketch 1
(709/164,287)



Sketch 2
(US 5,579,782)



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